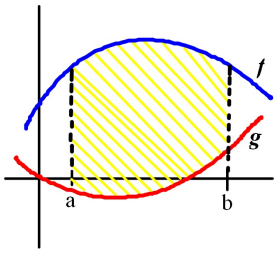
6.1 Find the area between curves

The area of a region located between 2 curves can be found using the following definite integral:

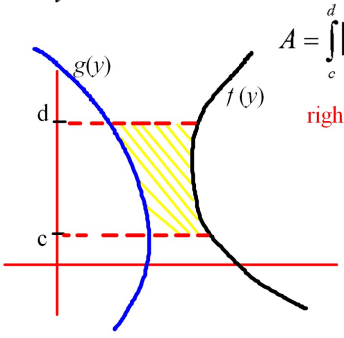


$$A = \int_a^b [f(x) - g(x)]\,dx$$

upper curve - lower curve

Always include a graph for area problems!

The same concept can be used for functions of y.



$$A = \int_c^d [f(y) - g(y)]\,dy$$

right curve - left curve

Examples:

1. Find the area of the region bounded by the graphs of $f(x) = x^2 + 2x + 1$, $g(x) = 2x + 5$, $x = -1$, and $x = 1$.

2. Find the area of the region bounded by the graphs of $y = x^2$ and $y = x^3$.

3. Find the area of the region bounded by $y = \sin x$, $y = \cos x$, $x = 0$, and $x = \pi$.

4. Find the area of the region bounded by $f(y) = y(2 - y)$ and $g(y) = -y$.